

KS3 Chemistry

8H The Rock Cycle

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Contents

8H The Rock Cycle

- Sedimentary rocks
- Metamorphic rocks
- Igneous rocks
- The rock cycle
- Summary activities

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Examples of sedimentary rocks

limestone

chalk

sandstone

sandstone

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How can you describe sandstone?

Sandstone is ...

...an orangey-coloured rock which looks like lots of sand grains stuck together. It is quite soft.

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How can you describe limestone?

Limestone is ...

...a grey/white rock which is mostly made from crushed sea shells. Limestone often contains fossils.

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How can you describe chalk?

Chalk is ...

...a white or grey powdery rock with very fine grains. Chalk often contains fossils.

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Properties of sedimentary rocks

What are the properties of sedimentary rocks?

- Sedimentary rocks often have **layers** showing the deposition of sediment at different time periods.
- Sedimentary rocks consist of lots of **small grains**. These grains may be weakly held together so the rocks are often porous and may be soft and crumbly.
- Sedimentary rocks often have **fossils** trapped within them.

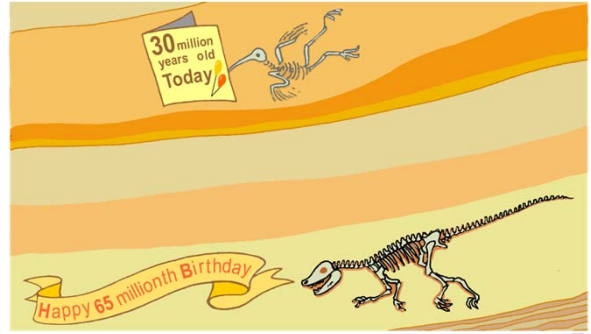


Sedimentary rocks consist of layers of lots of small particles and are often porous.



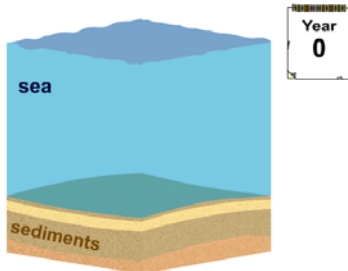
Comparing ages of sedimentary rocks

- Why are sedimentary rocks near the surface younger than sedimentary rocks deeper down?



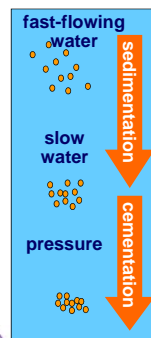
Sedimentary rock animation

How are sedimentary rocks formed?



Formation by cementation of sediment

- Some sedimentary rocks are formed by the cementation of sediment.



- Weathering creates small rock fragments which are transported to the sea where they are deposited (sink) and form a sediment.
- At this stage, dead creatures may become trapped within the sediment and give rise to fossils.
- Over millions of years, the pressure of layers above and the effects of salts cement the sediment together. This is how sedimentary rocks like sandstone, mudstone and limestone are formed.

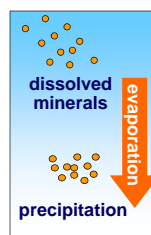
Pancake Rocks in New Zealand

- These limestone rocks at Punakaiki in New Zealand are known as the Pancake Rocks. How were they formed?



Formation by precipitation of minerals


- Sedimentary rocks can also be formed from minerals which are left behind when water evaporates.



- Certain minerals are dissolved in seas and lakes.
- Over millions of years these seas or lakes dry up.
- As the water disappears, the dissolved minerals precipitate.
- Chalk and limestone, common in the UK, can be formed in this way.

Which type of sedimentary rock?

Which type of sedimentary rock?



? ? ? ?

chalk sandstone mudstone limestone

? C solve

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Examples of metamorphic rock

marble




slate



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What is marble?

Marble is ...




...a hard smooth rock made from sedimentary limestone or chalk in conditions of strong heat and low pressure.

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What is slate?

Slate is ...



...a grey rock with fine grains made from sedimentary shale in conditions of low temperature and low pressure. Slate can be split into thin sheets.


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Properties of metamorphic rocks

How are the properties of metamorphic rocks different from sedimentary rocks?

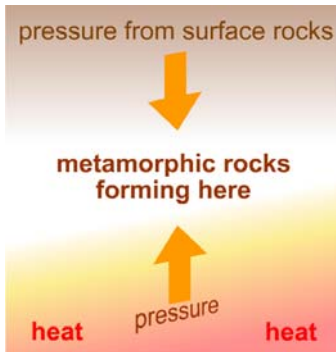
- Metamorphic rocks often have layer structures of **crystals** caused by the effect of heat and pressure.
- Metamorphic rocks are usually **denser and harder** than sedimentary rocks.
- Metamorphic rocks sometimes show **distortions** caused by the movements that led to their formation. This may give rise to **wavy or zig-zag patterns** within the rock.

Metamorphic rocks contain regular layers of crystals that sometimes have a wavy or zig-zag arrangement.



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Formation of metamorphic rocks



- Metamorphic rocks are formed by the effect of extreme pressures and temperatures deep within the Earth.
- These conditions change the structure of existing rocks so that new rocks are formed.

Which type of metamorphic rock?

Which type of metamorphic rock?

Dark grey rock used for roofing since it easily splits into thin layers.

marble

Smooth and hard white rock widely used in building and sculpturing.

mica

Transparent sheets used as an insulator in some electrical devices.

slate



solve



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Examples of igneous rocks

granite



pumice



basalt



What is granite?

Granite is...



...a hard grey rock consisting of large crystals that are randomly arranged.

What is pumice?

Pumice is ...



...a pale grey rock made up of very small crystals and is porous and extremely light.

What is basalt?

Basalt is ...



...a dark glassy rock which has very fine crystals and often forms as columns of rock.

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Properties of igneous rocks

What are the properties of igneous rocks?

- Igneous rocks contain **interlocking crystals** which are held together very strongly and make the rock hard.
- The crystals in igneous rocks have a disorderly arrangement.
- The size of the crystals depends on how quickly the igneous rock solidifies.
- Igneous rocks never contain fossils.

Igneous rocks consist of randomly arranged interlocking crystals.



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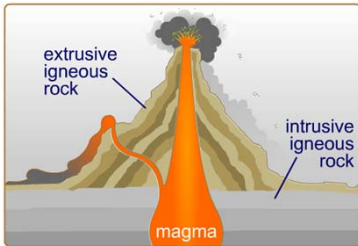
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Formation of igneous rocks

How are igneous rocks formed?

Deep in the ground is molten rock called **magma**. Sometimes, magma bursts through the surface causing volcanic eruptions.

Igneous rocks are formed when **magma cools and solidifies**.



- When magma cools above the surface, **extrusive igneous rocks** are formed.
- When magma cools below the surface, **intrusive igneous rocks** are formed.

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Size of crystals in igneous rocks

How is the size of crystals in igneous rocks determined by the rate at which magma cools and solidifies?

- Magma above the Earth's surface **cools quickly**. Only **small crystals** are formed as the magma solidifies.

This is how **extrusive igneous rocks** like pumice and basalt are formed.



- Magma below the Earth's surface **cools slowly**. There is time for **large crystals** to grow as the magma solidifies.

This is how **intrusive igneous rocks** like granite are formed.



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Which type of rock am I?

Which type of rock am I?

Description	igneous	sedimentary	metamorphic
I am formed by heat and pressure.			
I contain many fossils.			
I contain some really big crystals.			
I do not contain any fossils.			
I contain many small grains "cemented" together.			
I have regular layers which are sometimes wavy.			

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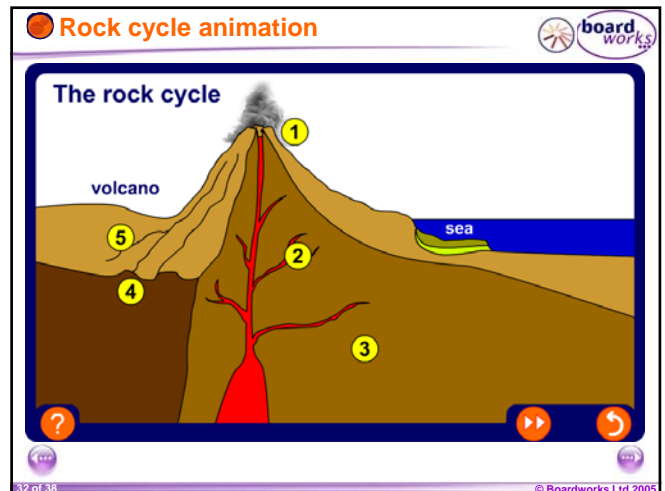
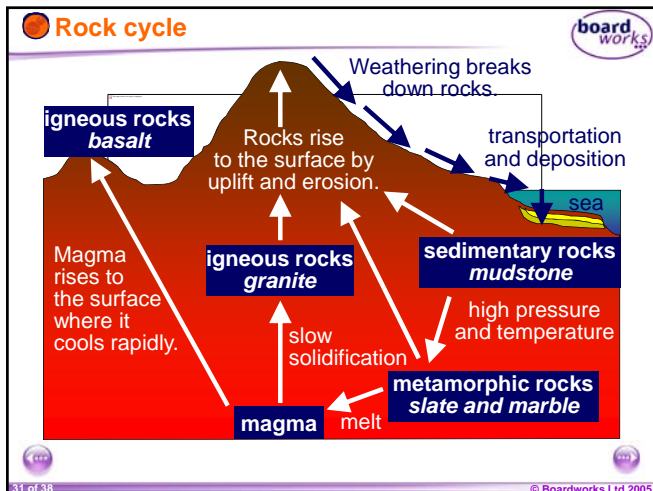
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Complete the sentences

Find the right words to complete the rock cycle.

When molten _____ solidifies on or close to the surface of the Earth, _____ rocks are formed.

Rocks on the Earth's surface are broken down by _____ which involves _____ chemical and biological processes.

magma	metamorphic	weathering
transported	igneous	magma
pressure	sedimentary	physical

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- ### Glossary
- extrusive** – Igneous rock that formed above the Earth's surface and which is made up of very small crystals.
 - fossil** – The remains or traces of a plant or animal preserved in rock, common in sedimentary rock.
 - igneous** – Rocks made from magma that has cooled and solidified.
 - intrusive** – Igneous rock that formed below the Earth's surface and which is made up of large crystals.
 - magma** – Hot molten rock below the Earth's surface.
 - metamorphic** – Rocks formed under extreme pressure and temperature from existing rocks.
 - rock cycle** – The cycle linking the processes which form igneous, sedimentary and metamorphic rocks.
 - sedimentary** – Rocks made from layers of sediment and dead creatures pressurised and cemented together.
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Anagrams

How quickly can you unscramble anagrams of words about

**t h e
r o c k
c y c l e ?**

Click "start" for the first of eight anagrams.

start

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Crossword

Across:

- Rocks made from very small fragments of rock
- Rocks changed by heat and pressure
- Molten rock in the ground
- Rocks formed when magma solidifies

Down:

- The process that glues sedimentary rocks together
- One factor that causes rocks to change
- The size of crystals in rocks that solidify quickly
- The size of crystals in rocks that solidify slowly

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Multiple-choice quiz

30 million years old Today

Can you rock-and-roll your way through this rock cycle quiz?

Happy 65 millionth Birthday

start

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